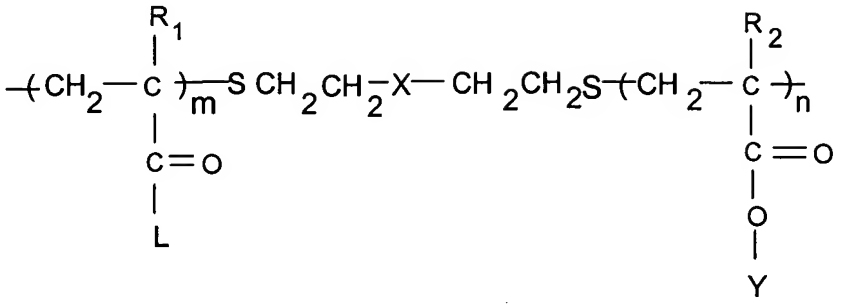
CLAIMS:

1. Block copolymers having formula 1:



Wherein,

R_1 is H, CH_3, C_2H_5, C_6H_5,

R_2 is H, CH_3, C_2H_5, C_6H_5,

X is an ester or amide link,

m is in the range of 3 to 500,

n is in the range of 2 to 50,

L is OH, NH_2, OCH_3, $NHCH(CH_3)_2$,

Y is N-Acetyl Glucosamine, mannose, galactose, sialic acid, fructose, ribulose, erythrolose, xylulose, psicose, sorbose, tagatose, glucopyransoe, fructofuranose, deoxyribose, galactosamine, sucrose, lactose, isomaltose, maltose, cellobiose, cellulose and amylose.

2. Block copolymers as claimed in claim 1, wherein molecular weight of block copolymers is in the range of 1000 Daltons to 200000 Daltons.
3. Block copolymers as claimed in claim 1, wherein the block copolymers having ligand are useful for applications in medical and biotechnology.

4. Block copolymers as claimed in claim 1, wherein the block copolymers are more stable for interactions with bio-molecules than the natural polymers such as chitin and chitosan having natural N-Acetyl glucosamine.

5. Block copolymers as claimed in claim 1, wherein the block copolymers having ligands enhances binding effect by binding simultaneously on the multiple sites of the enzyme / disease causing viruses.

6. Block copolymers as claimed in claim 1, wherein the block copolymers provide greater accessibility to the ligand conjugate for binding with receptor bio-molecules.

7. Block copolymers as claimed in claim 1, wherein the block copolymers are effective at very low concentrations.

8. Block copolymers as claimed in claim 1, wherein block copolymers having ligands and NAG are stable, water soluble, resistant to degradation and free from the microbial contamination thus having advantage over natural polymers like chitin and chitosan.

9. Block copolymers as claimed in claim 1, wherein different monomers are incorporated in the block copolymer chain to make it hydrophobic or hydrophilic.

10. Block copolymer as claimed in claim 1, wherein relative inhibition of lysozyme in terms of I_{50} for monomer NAG is 74.00mM and has decreased to 0.00026, which is almost 290000 times lower than that for NAG.

11. Block copolymer as claimed in claim 1, wherein the block copolymer having weight 14000 – 638 has binding constant 1.38 x10 ^{6} which shows 38000 folds enhancement over NAG (5.24 x 10 ^{2}).

12. A novel process for the preparation of block copolymers as claimed in claim 1, comprising of:

    a) dissolving polymer having terminal reactive group in a solvent,

    b) adding to solvent of step (a), an oligomer having terminal reactive group forming a reaction mixture,

    c) dissolving a coupling agent to the reaction mixture of step (b),

    d) allowing a reaction between the reaction mixture and the coupling agent for a period of 24 hrs to 48 hrs at a room temperature,

    e) removing the unreacted coupling agent,

    f) precipitating in a non-solvent and vacuum drying at room temperature to obtain the block copolymer.

13. A process as claimed in claim 12, wherein polymers having terminal reactive group is selected from the group comprising of acrylic acid, methacrylic acid, methacryloyl chloride, acrylamide, N-isopropyl acrylamide (NIPA), 2-acrlamido-2-methyl propanesulphonic acid (AMPS), methacrylate, acryloyl chloride, acryloyl morpholine, vinyl pyrrolidone, styrene, allyl alcohol and allyl amine.

14. The process as claimed in claim 12, wherein the polymer having termainal reactive group ligands is selected from the group comprising of polymethacryloyl NAG or polacryloyl NAG or Poly vinyl benzyl NAG.

15. The process as claimed in claim 12, wherein the polymer having terminal reactive group contains COOH or OH groups at both ends.

16. The process as claimed in claim 12, wherein the oligomer having terminal reactive group ligands is selected from the group comprising of polymethacryloyl NAG, polyacryloyl NAG, poly vinyl benzyl NAG.

17. The process as claimed in claim 12, wherein the oligomer having terminal reactive group contains COOH, OH or NH_2.

18. The process as claimed in claim 12, wherein the organic solvent used to dissolve the polymer having terminal reactive group and oligomer having terminal reactive group is selected from the group comprising of dimethyl formamide, tetra hydro furan and di-methyl sulfoxide.

19. The process as claimed in claim 12, wherein the coupling agent used is selected from the group comprising of Di Cyclohexyl Cabodiiminde (DCC), 1-Cyclohexyl 3-(2-Morpholinoethyl) Carbodiimide metho-p-toluenesulfonate (CMC), 1-ethyl-3-(3-Dimethylamino-propyl) Carbodiimide (EDC).

20. The process as claimed in claim 12, wherein molar ratio of coupling agent for condensation of polymers is 1:1.

21. The process as claimed in claim 12, wherein the room temperature is in the range of 15 – 45 °C.

22. The process as claimed in claim 12, wherein the non-solvent used to precipitate the block copolymers is selected from the group comprising of acetone, diethyl ether, hot water and hexane.

23. The method as claimed in claim 12, wherein the block copolymer having weight 14000 – 638 has binding constant 1.38 x10 ^{6} which shows 38000 folds enhancement over NAG (5.24 x 10 ^{2}).

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